Augusta Quadrangle, Maine

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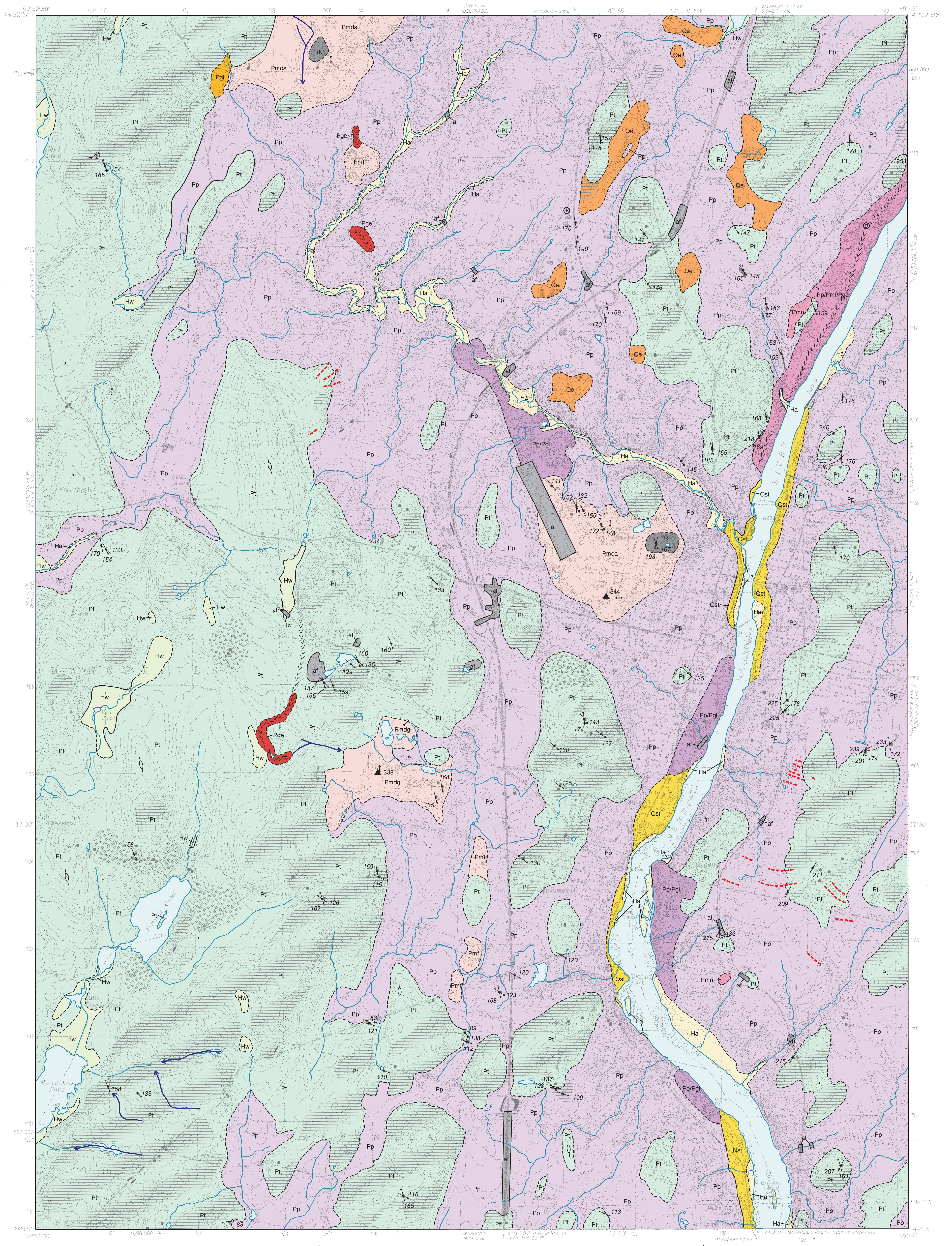
Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping of the Augusta quadrangle was conducted by Woodrow B. Thompson in 2003-04 for the STATEMAP program. Some of the data included here were collected by W. B. Thompson during reconnaissance surficial mapping of the Augusta 15-minute quadrangle in 1975 and scattered observations during the 1980's and 1990's.

Quadrangle Location

SCALE 1 : 24,000

1 MILE · 7000 FEET · 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Augusta quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

Ha — **Stream alluvium** - Sand, gravel, and silt deposited on flood plains of the Kennebec River and other streams. May include some wetland deposits.

Hw — **Wetland deposits** - Peat, muck, silt, and clay in poorly drained areas.

Qst — **Stream terraces** - Sand and gravel deposited by the Kennebec River at elevations higher than the most recent flood plains.

Qe — **Eolian deposits** - Windblown sand forming dunes and patchy irregular deposits in the northeastern part of the quadrangle. Derived from wind erosion of marine sediments on the Summerhaven delta (Pmds) to the northwest.

Pmn — **Marine nearshore deposits** - Small area of gravelly sediments in the Kennebec Valley. Inferred to have formed when marine processes reworked older glacial deposits during regression of the sea.

Pp — **Presumpscot Formation** - Glaciomarine silt, clay, and sand deposited on the late-glacial sea floor.

Pmd — **Glaciomarine deltas** - Sand and gravel deposited into the sea and built up to the ocean surface. Formed at the glacier margin during recession of the late Wisconsinan ice sheet. Elevation of boundary between topset and foreset beds in each delta indicates the position of sea level when the delta was deposited.
- Pmdg - Granite Hill delta. Topset/foreset contact at 338 ft (103.0 m).
- Pmda - Augusta Airport delta. Topset/foreset contact at 344 ft (104.9 m).
- Pmds - Summerhaven delta. Topset/foreset contact at 356 ft (108.5 m).

Pmf — **Glaciomarine fans** - Sand and gravel deposited as submarine fans at the glacier margin during recession of the late Wisconsinan ice sheet

Pp/Pgi — **Presumpscot Formation overlying ice-contact deposits** - Areas of sand and gravel (Pgi) deposited as eskers and/or glaciomarine fans adjacent to glacial ice in the Kennebec River and Bond Brook valleys. The ice-contact deposits are overlain by variable thickesses of glaciomarine silt, clay, and sand (Pp). These units were not mapped individually because of poor exposure and complex stratigraphy.

Pp/Pmf/Pge — **Presumpscot Formation overlying esker and glaciomarine fan deposits.** These deposits form a complex assemblage in the Kennebec River valley. A discontinuous ridge of coarse esker gravel (Pge) in the valley bottom is generally buried by submarine fan deposits (Pmf) comprised of well-stratified sand and gravel. Variable thicknesses of glaciomarine silt, clay, and sand (Pp) overlie the sand and gravel units, and are locally overlain in turn by coarser sediments formed by wave and current action as relative sea level fell. These units could not be distinguished accurately at the scale of the map, due to their complex interrelations and limited fresh exposures. Bedrock has been exposed in some of the deeper gravel pits, and large portions of the sand and gravel units have been removed.

Pgi — **Ice-contact deposits.** Sand and gravel deposited in contact with glacial ice in northwestern part of quadrangle. Pgi sediments show local deformation resulting from melting of adjacent supporting ice masses.

Pge — **Esker** - Sand and gravel deposited by glacial meltwater streams in tunnels beneath the ice. Chevron symbols show inferred direction of former stream flow.

Pt — **Till** - Loose to very compact, poorly sorted, massive to weakly stratified mixture of sand, silt, and gravel-size rock debris deposited by glacial ice. Locally includes lenses of waterlaid sand and gravel. Boulders commonly present on ground surface.

Bedrock outcrops/thin-drift areas - Ruled pattern indicates areas where bedrock outcrops are common and/or surficial sediments are generally less than 10 ft thick. Mapped from air photos and ground observations. Actual thin-drift areas probably are more extensive than shown. "rk" indicates large area of bedrock exposure. Dots mark locations of small individual outcrops.

af — **Artificial fill** - Variable mixtures of earth, rock, and/or man-made materials used as fill for roads and airport runways. Also includes waste heaps from rock quarries. Shown only where large enough to affect the contour pattern on the topographic map. Some recently filled areas at shopping centers and the Augusta airport are not shown here.

Contact - Boundary between map units, dashed where approximate.

Moraine ridge - Line shows inferred crest of moraine ridge deposited along the retreating margin of the most recent (late Wisconsinan) glacial ice sheet.

Glacially streamlined hill - Symbol shows long axis of hill or ridge shaped by flow of glacial ice, and which is parallel to former ice-flow direction.

135 — **Glacial striation locality** - Arrow shows ice-flow direction inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction. Flagged trend is older.

Dip of cross-bedding - Arrow shows average dip direction of cross-bedding in fluvial or deltaic deposits, which indicates direction of stream flow or delta progradation. Dot marks point of observation.

Meltwater channel - Channel eroded by glacial meltwater stream. Arrow shows inferred direction of former stream flow.

>>>>> **Crest of esker** - Alignment of symbols shows trend of esker ridge. Chevrons point in direction of meltwater flow. The series of chevrons in the western part of the quadrangle (not separately mapped as Pge) designates a possible esker that has been inferred from air photos and a few field observations of sand or gravel.

Area of many large boulders, where observed. May be more extensive than shown.

▲344 — Surveyed elevation (in feet) of contact between topset and foreset beds in glaciomarine delta. This was the local elevation of sea level when the delta was deposited.

Ⓕ — Site where marine fossils have been found.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Thompson, W. B., and Locke, D. B., 2004, Surficial materials of the Augusta quadrangle, Maine: Maine Geological Survey, Open-File Map 04-30.
2. Neil, C. D., 1999, Significant sand and gravel aquifers of the Augusta quadrangle, Maine: Maine Geological Survey, Open-File Map 99-33.
3. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print).
4. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.